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# COMPARATIVE FLOWS OF SELECTED UNITED STATES STREAMS VISUALLY EXPRESSED FOR WATER QUALITY SURVEYS

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# COMPARATIVE FLOWS OF SELECTED UNITED STATES STREAMS VISUALLY EXPRESSED FOR WATER QUALITY SURVEYS

By

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## INTRODUCTION

This document of river flow data has been prepared to assist those working in the aquatic environment by providing graphic representations of the approximate flows of selected streams. Momentary maximum, minimum day and mean flows for 48 streams are presented. The term "momentary maximum" refers to the maximum flow recorded momentarily during the water-year. Minimum day is the minimum average daily flow reported for the year. Mean flow refers to a yearly mean of the mean daily flows reported for a water-year.

The graphs and diagrams enable the rapid comparison of flow data from an unfamiliar stream with flow data from one that is familiar, and provide a visual impression that conveys understanding of one physical difference in the streams considered. All who are engaged in water associated activities should recognize at least one or more of the streams represented herein.

Many people in various water oriented studies experience difficulty in relating flow data to the actual flow of water in a particular stream, and they should find the enclosed information and diagrams useful. Individuals able to visualize differences in flows of streams, reported as "raw numbers," may have only limited use for the diagrammatic data in this paper. This information will prove useful to persons associated with water oriented projects as well as those trained in non-aquatic sciences, who must relate particular activities to water associated problems.

## METHODS

The United States Geological Survey Water Supply Papers, for the 1960 water-year (Sept. 1959-Oct. 1960) were used as a source for the data

on each stream depicted in this paper. These data are diagramed in two ways. Bar graphs are used to depict momentary maximum, minimum day and mean flows of each stream (Figures 1-12). Areal diagrams are used to depict mean flows only (Figures 13-18). The bar graphs in Figures 1-10 are arranged according to the amount of mean flow of each stream and Figures 11 and 12 compare the flows of several large streams. Areal diagrams in Figures 13-17 are presented according to drainage basin. Selected flows from each of the preceding figures are compared in Figure 18.

The area inside each areal diagram and the height of each bar graph represent stream flows in cubic feet per second (cfs). When comparing flow data, care should be taken to check the graph ordinates to avoid errors, because the graph ordinates are scaled differently.

Gauging stations from which flow data were obtained are located near the mouth of each stream unless the flow of a particular stream is affected by tides or another stream. When flows are so affected, data from the next station upstream were used to develop the graph presented herein. To emphasize flow differences in a stream, from the headwaters to the mouth, data from more than one gauging station were utilized for six large streams that pass through several states. When flow past a gauging station was controlled either by major diversion of water for irrigation or other uses, or by release of impounded water, the term "regulated flow" is included in the alphabetized table (Table 1) to show such an influence.

Stream names in Tables 1 and 2 are listed alphabetically and according to the mean flow of each. Reference information for each stream is included in Table 3.

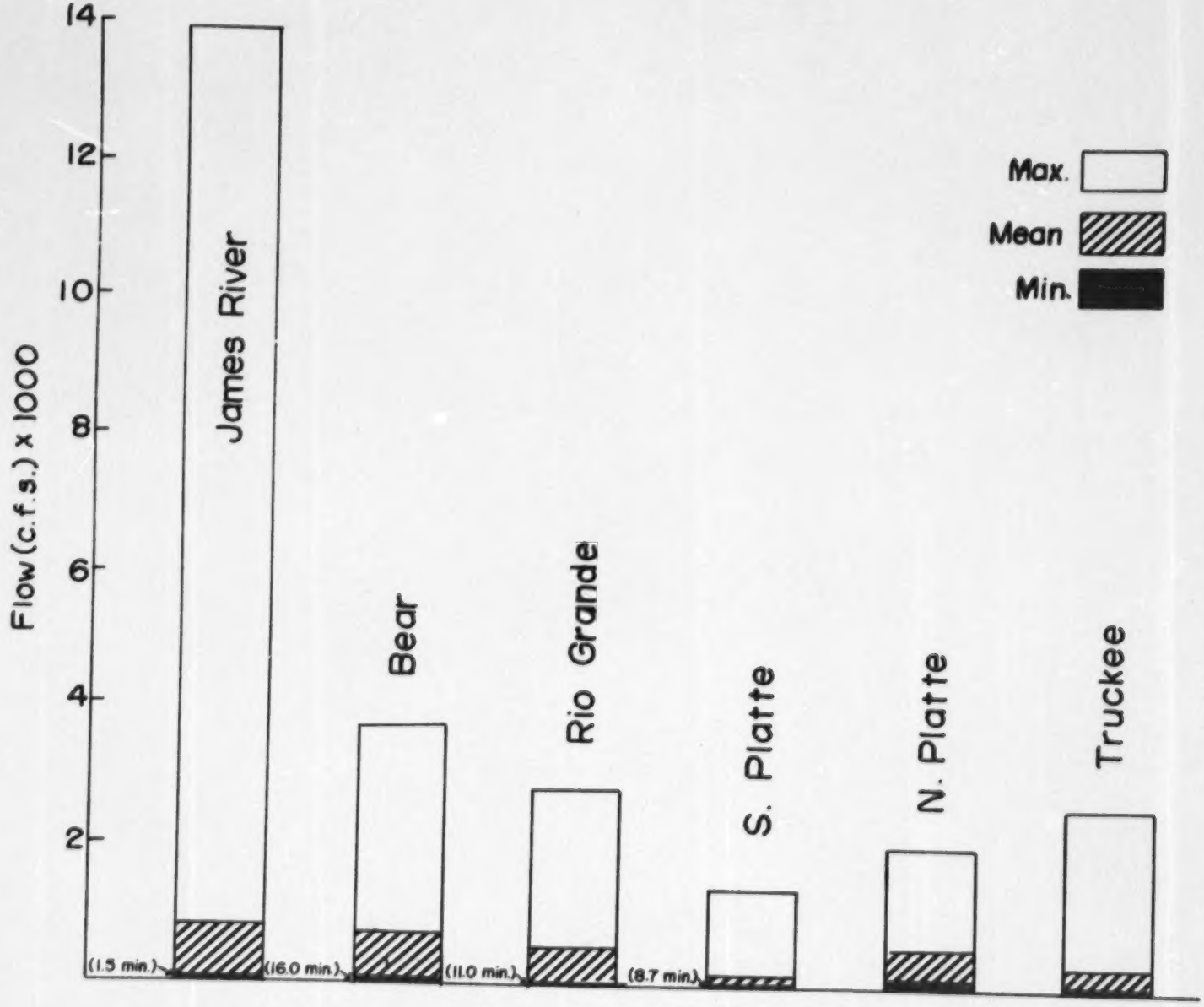


Figure 1. A comparison of selected streams with mean flows in the range of 0 to 1,000 cfs.

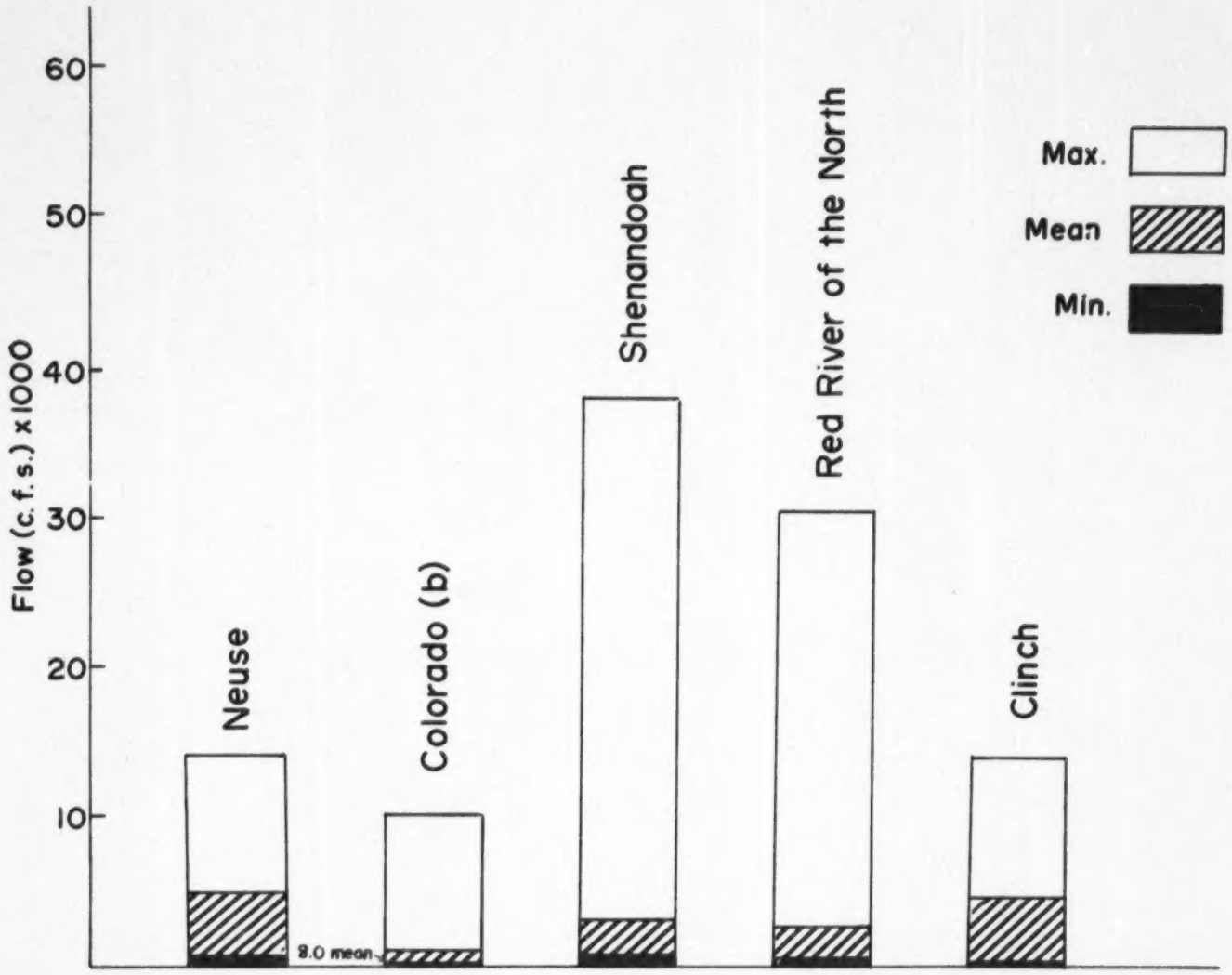


Figure 2. A comparison of selected streams with mean flows between 1,000 to 5,000 cfs.

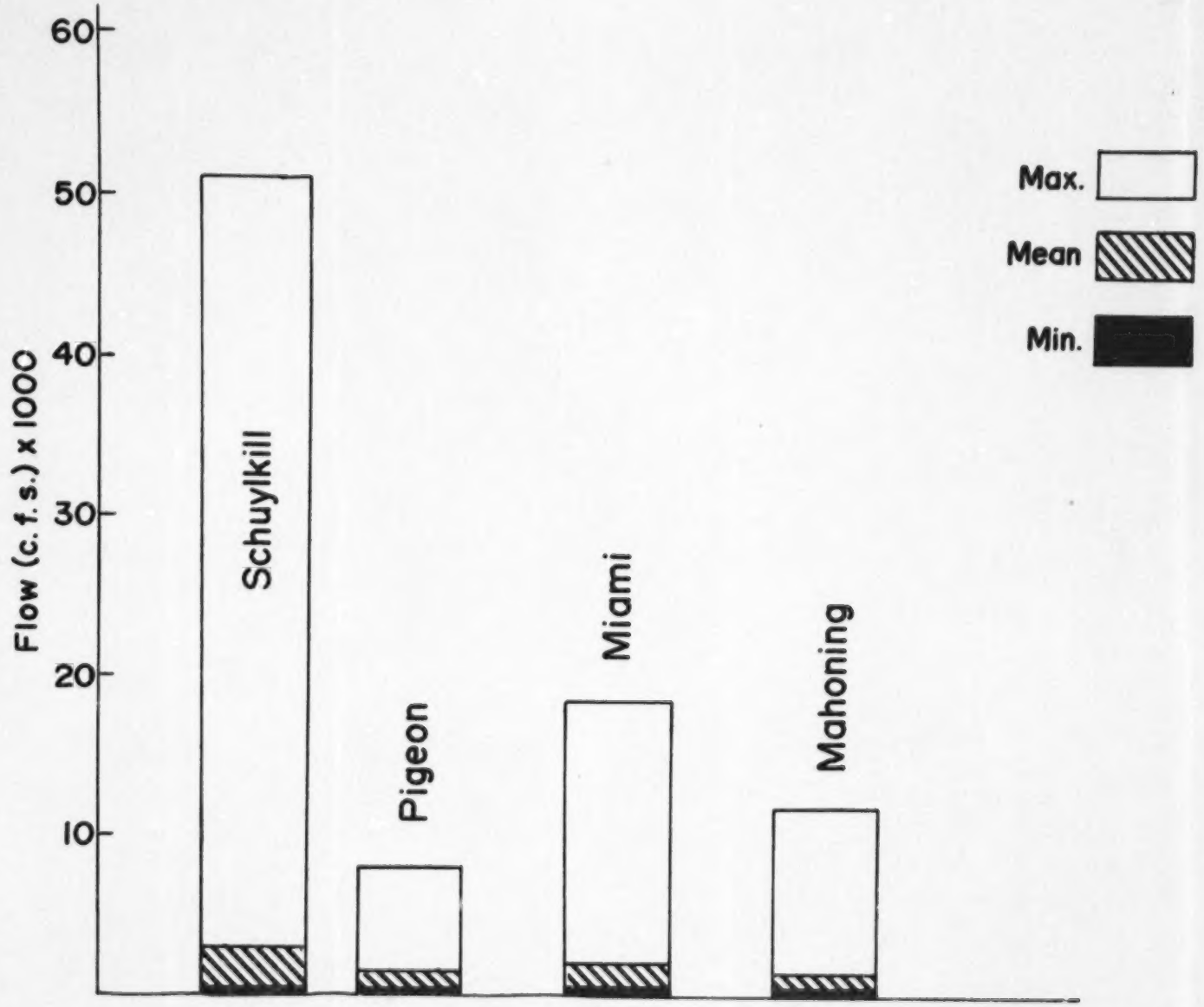


Figure 3. An additional comparison of selected streams with mean flows between 1,000 to 5,000 cfs.

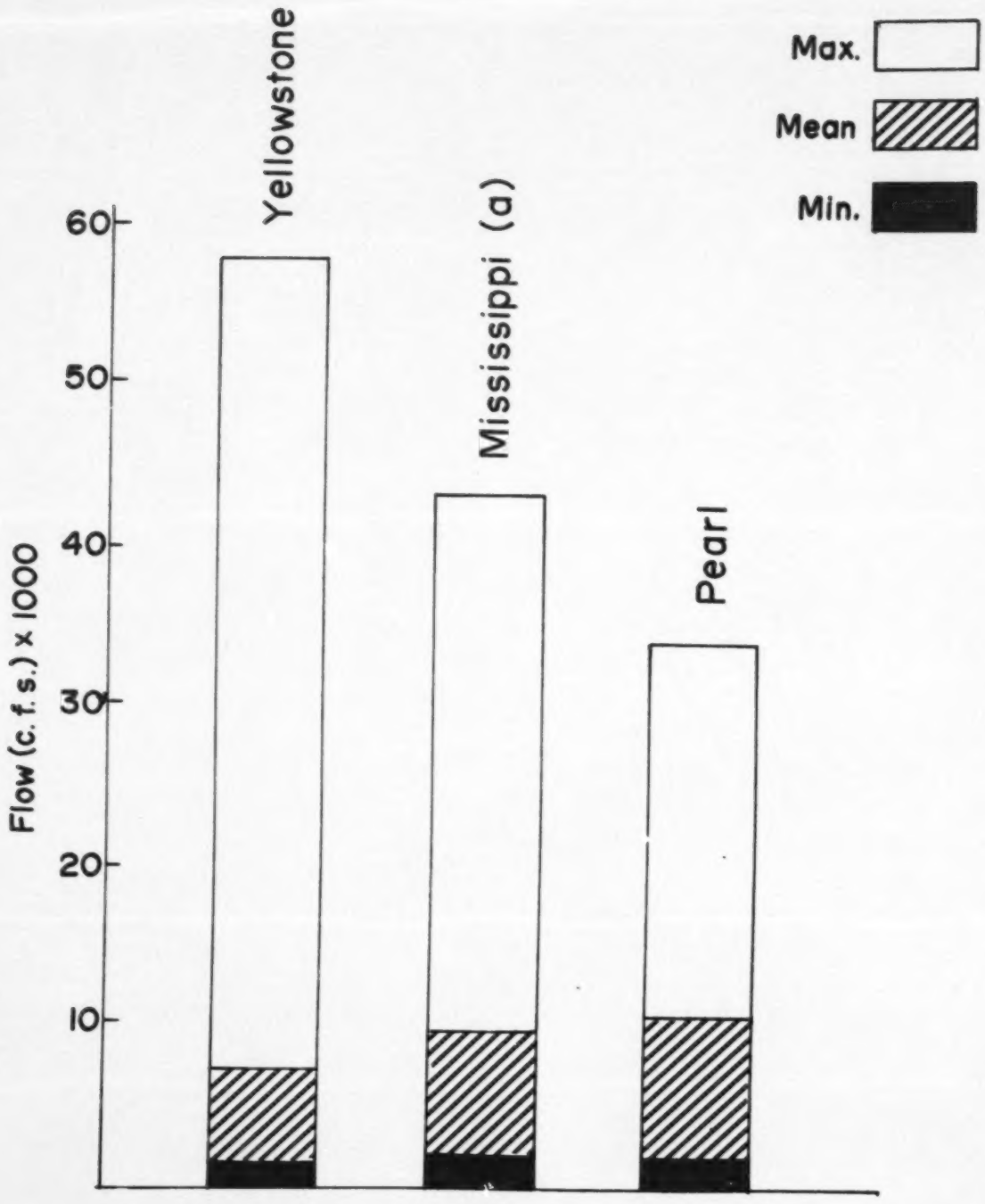


Figure 4. A comparison of selected streams with mean flows between 5,000 to 10,000 cfs.

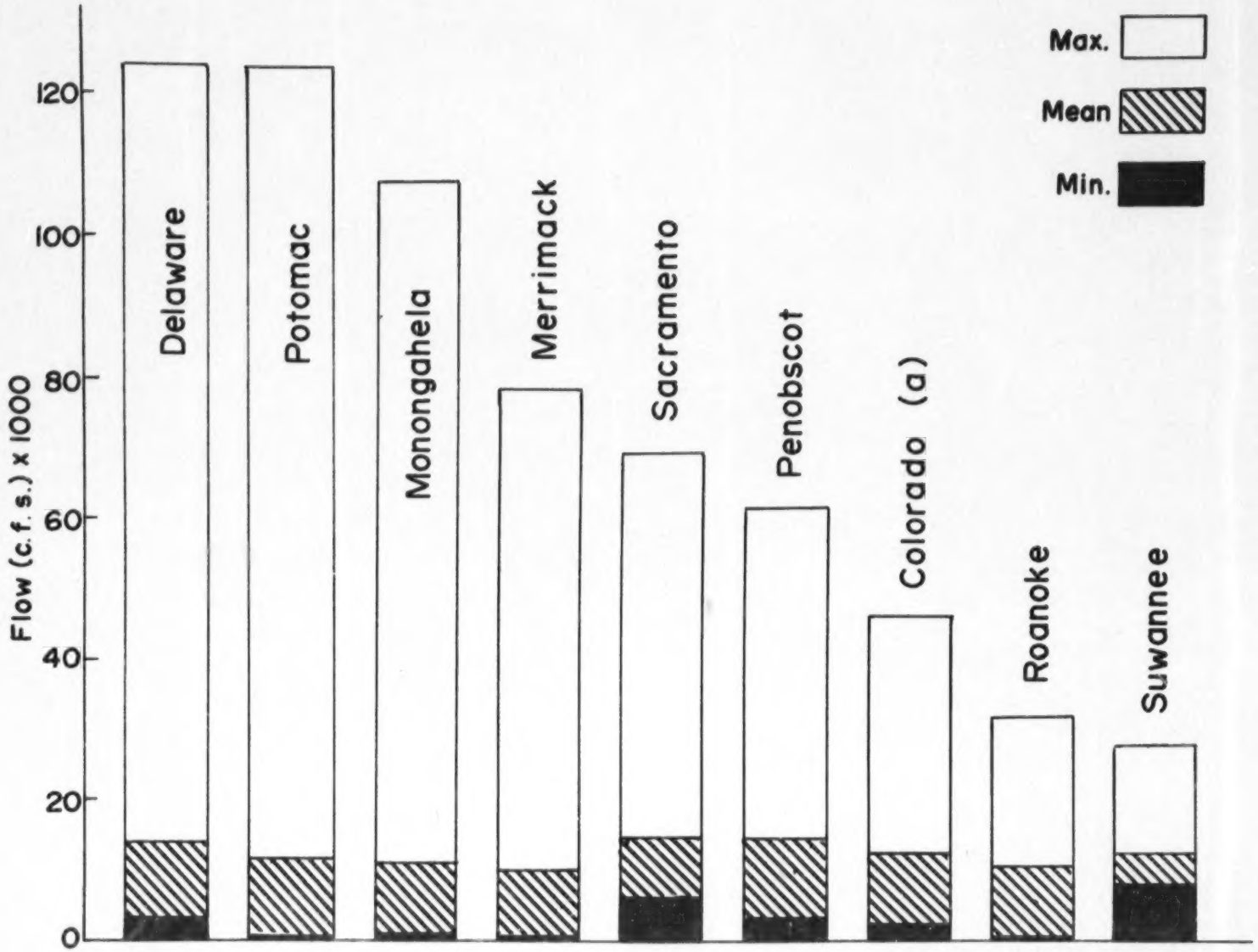


Figure 5. A comparison of selected streams with mean flows between 10,000 to 15,000 cfs.

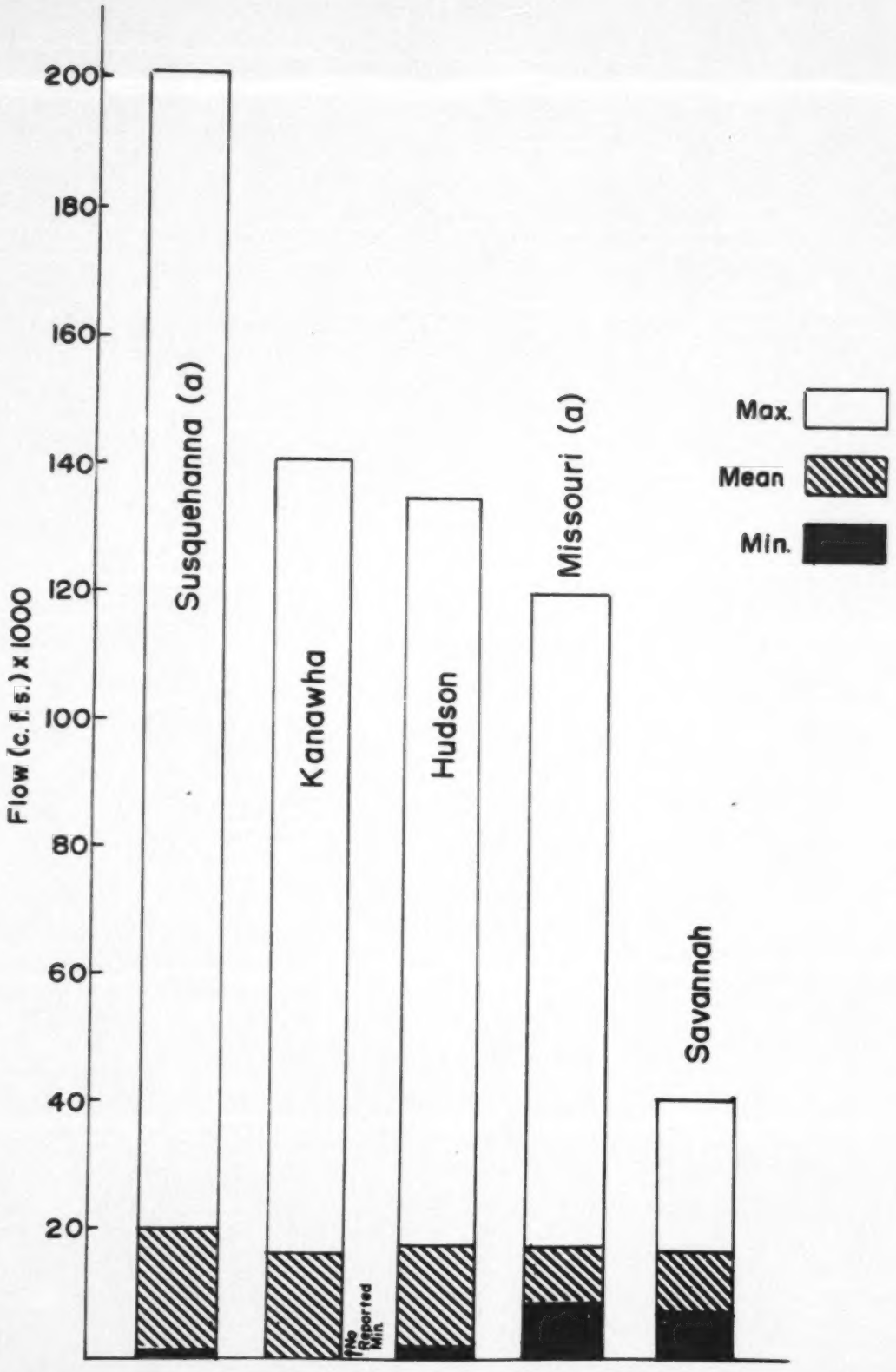


Figure 6. A comparison of selected streams with mean flows between 15,000 to 20,000 cfs.

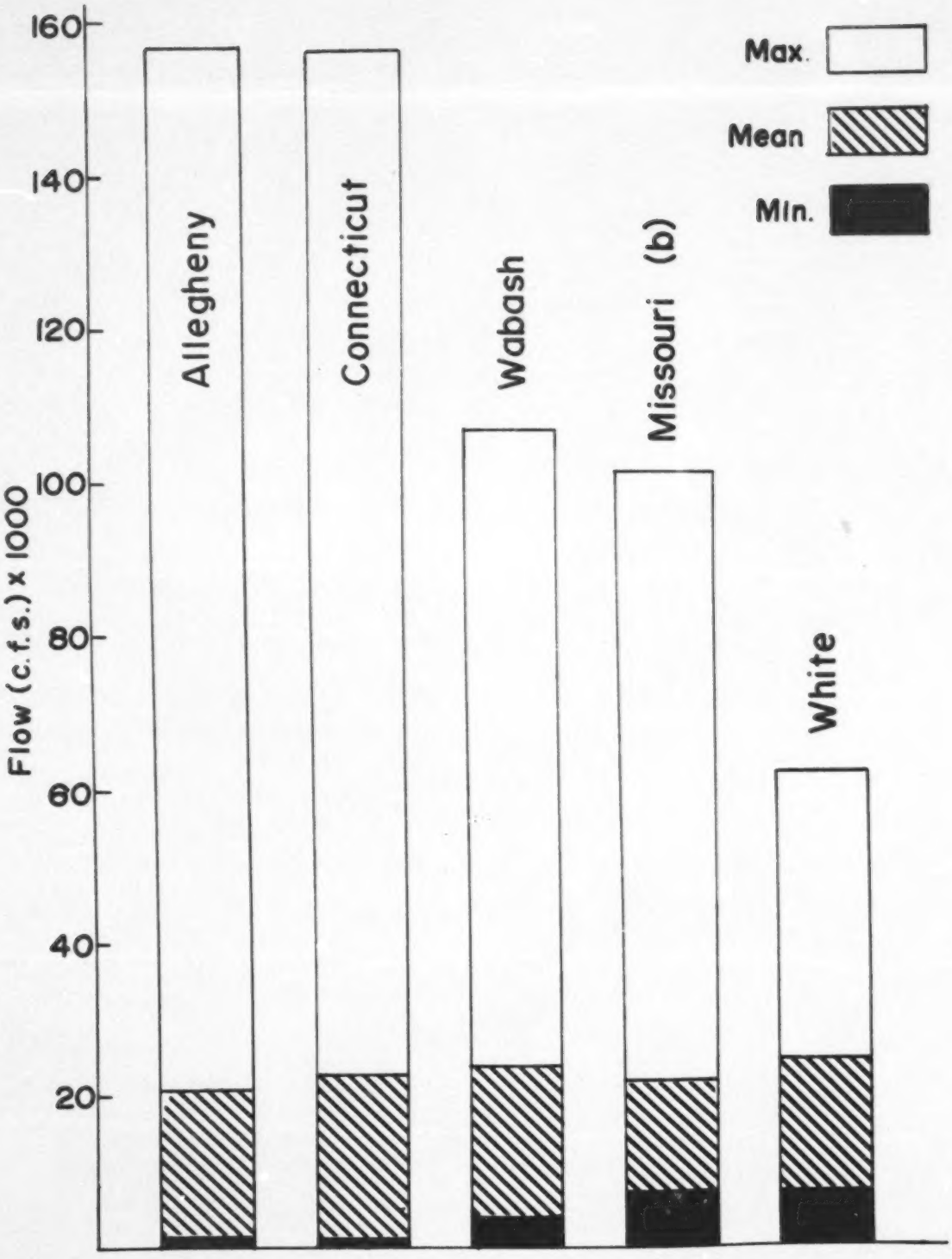


Figure 7. A comparison of selected streams with mean flows between 20,000 to 25,000 cfs.

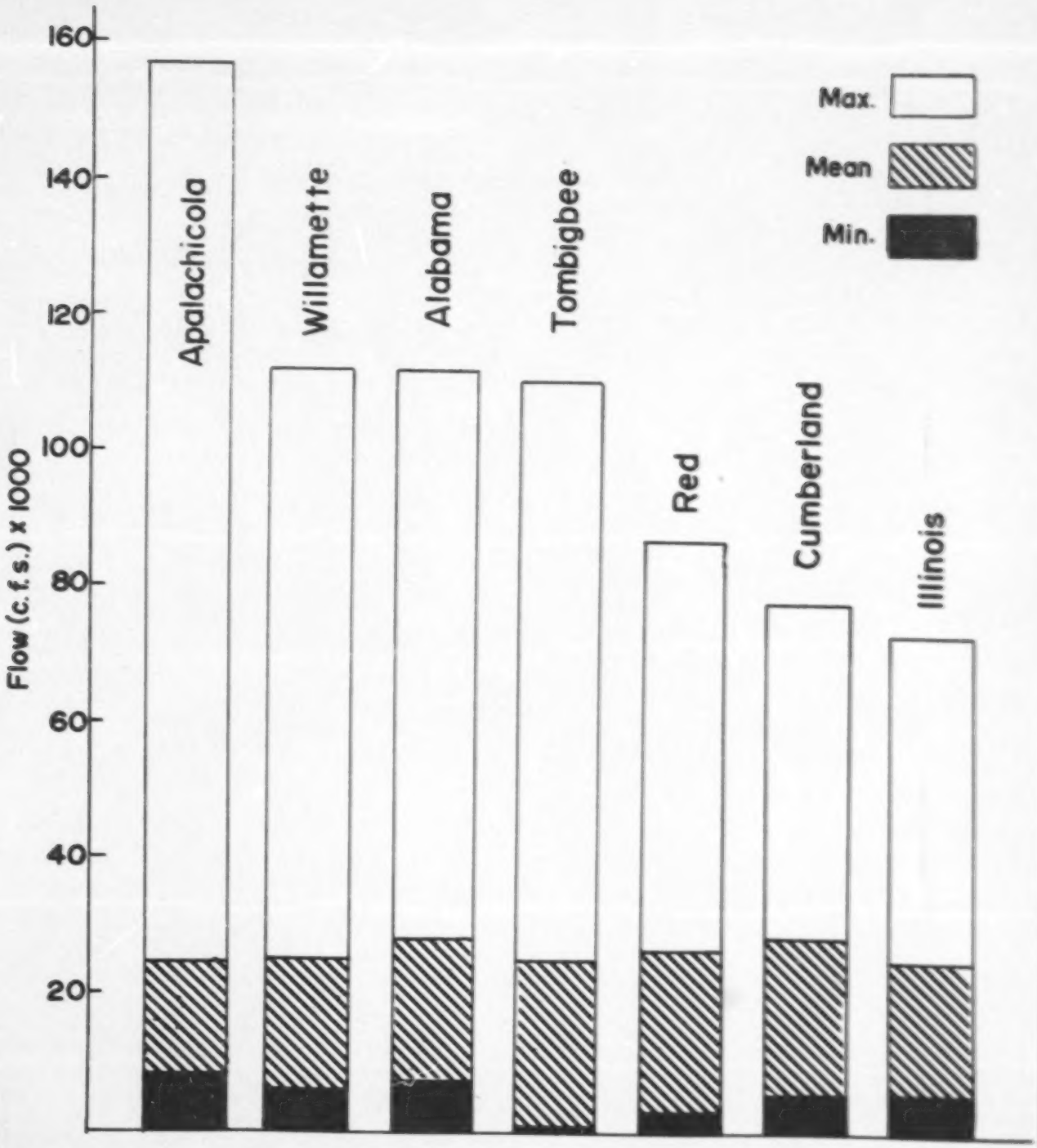


Figure 8. A comparison of selected streams with mean flows between 25,000 to 30,000 cfs.

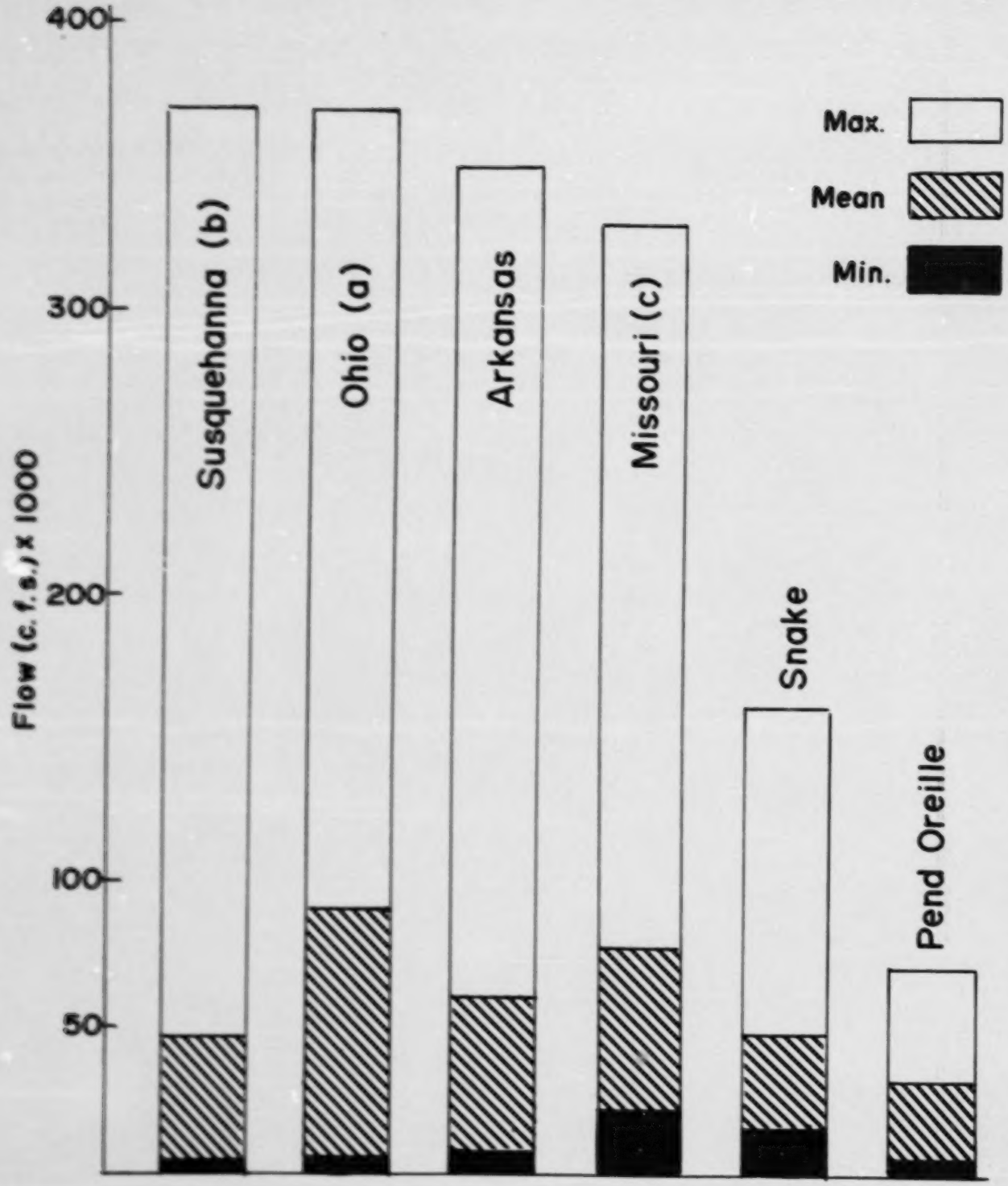


Figure 9. A comparison of selected streams with mean flows between 30,000 to 100,000 cfs.

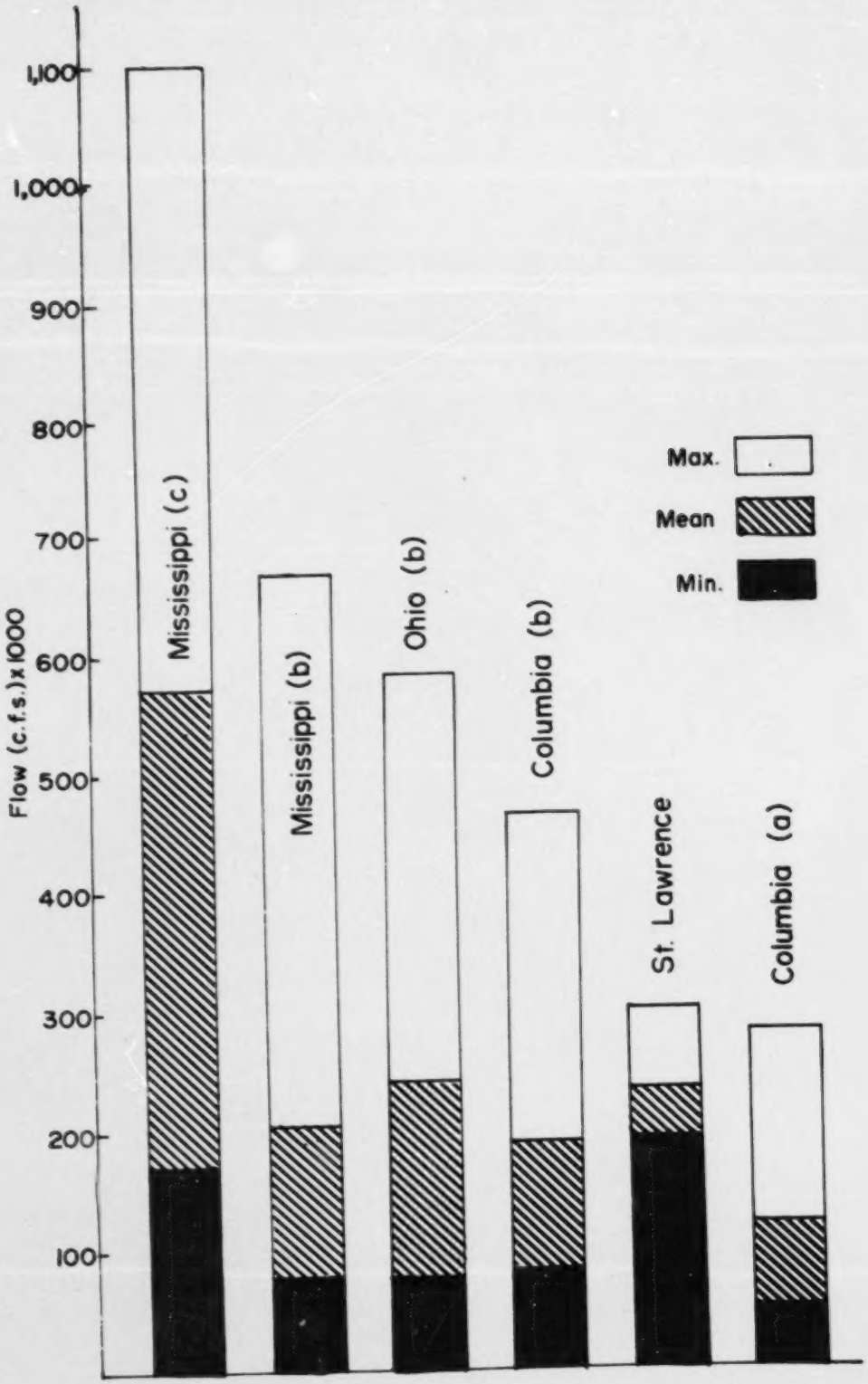


Figure 10. A comparison of selected streams with mean flows above 100,000 cfs.

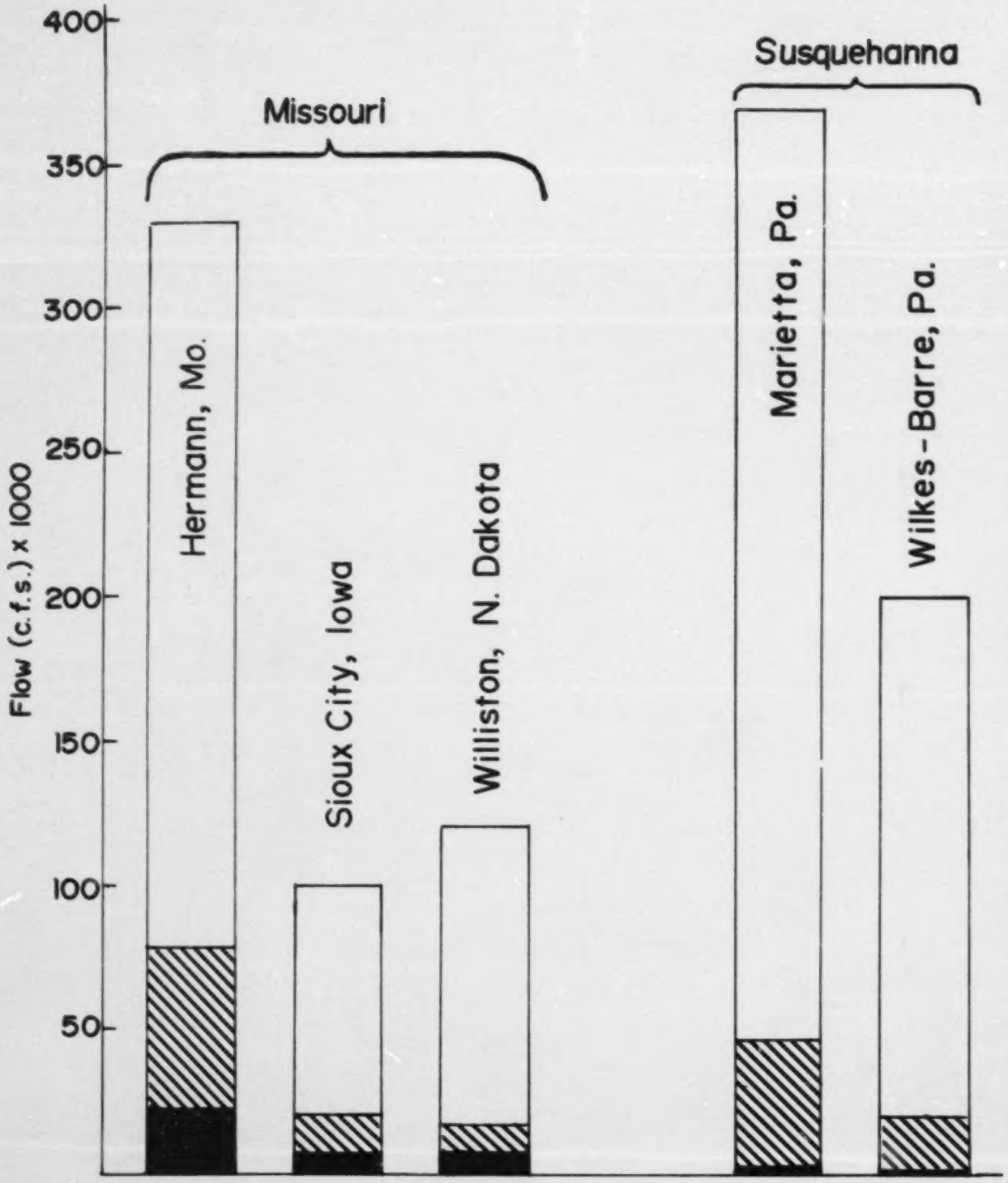


Figure 11. A comparison of flows from selected gauging stations on the Missouri and Susquehanna Rivers.

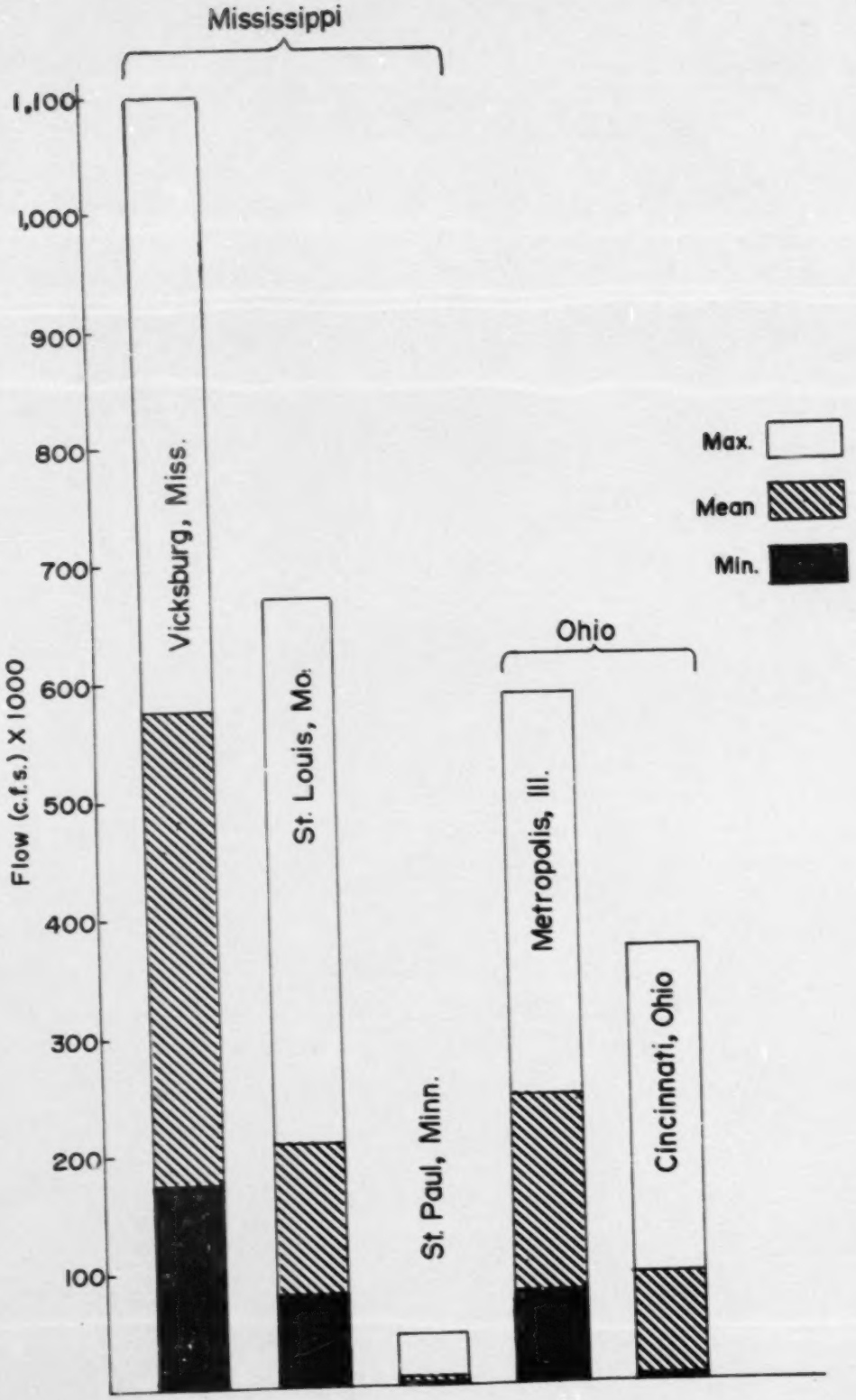


Figure 12. A comparison of flows from selected gauging stations on the Mississippi and Ohio Rivers.

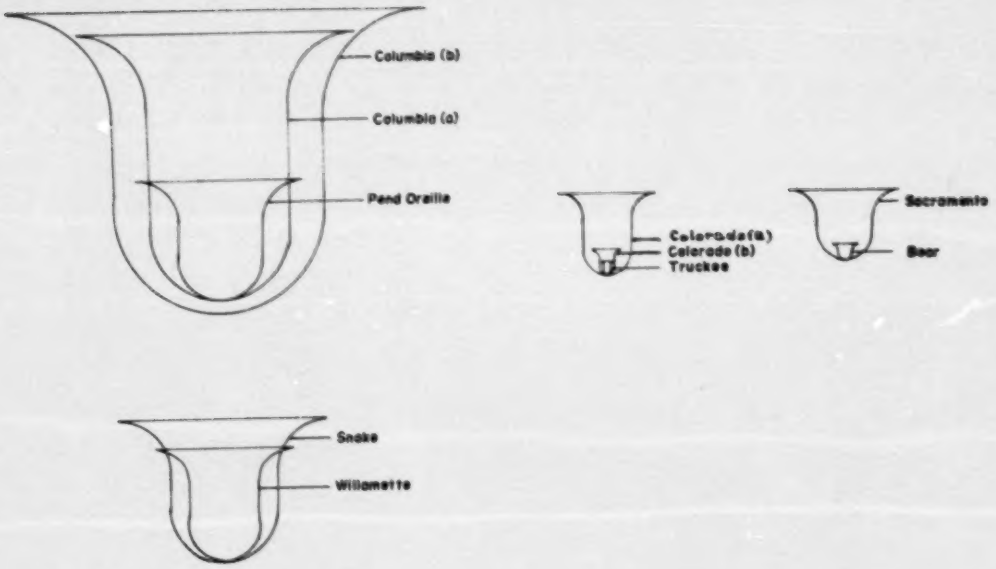


Figure 13. A comparison of mean flows of selected streams in the West Coast Basins.

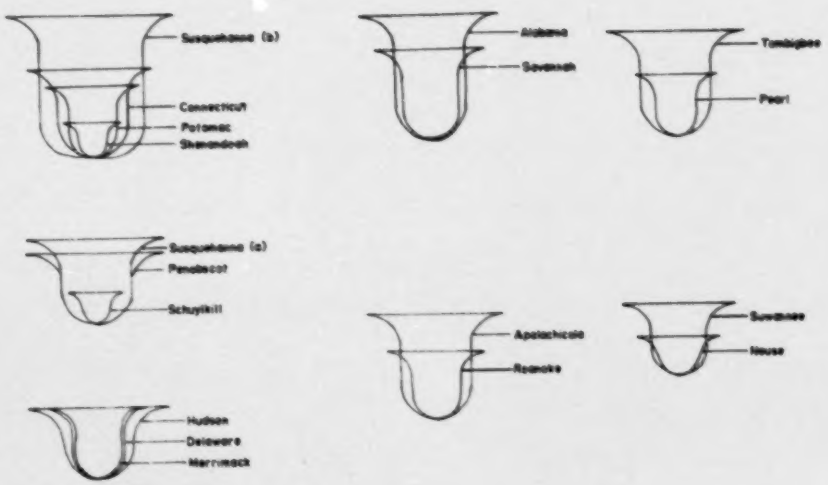


Figure 14. A comparison of mean flows of selected streams in the East Coast Basins.

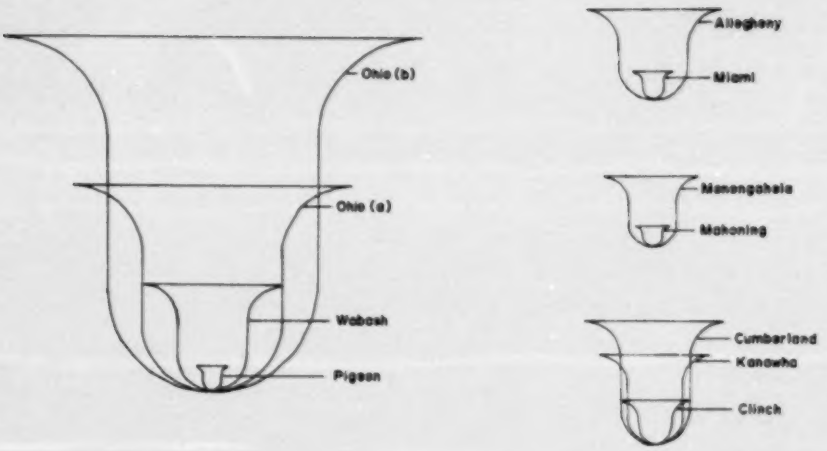


Figure 15. A comparison of mean flows of selected streams in the Ohio and Tennessee Basins.

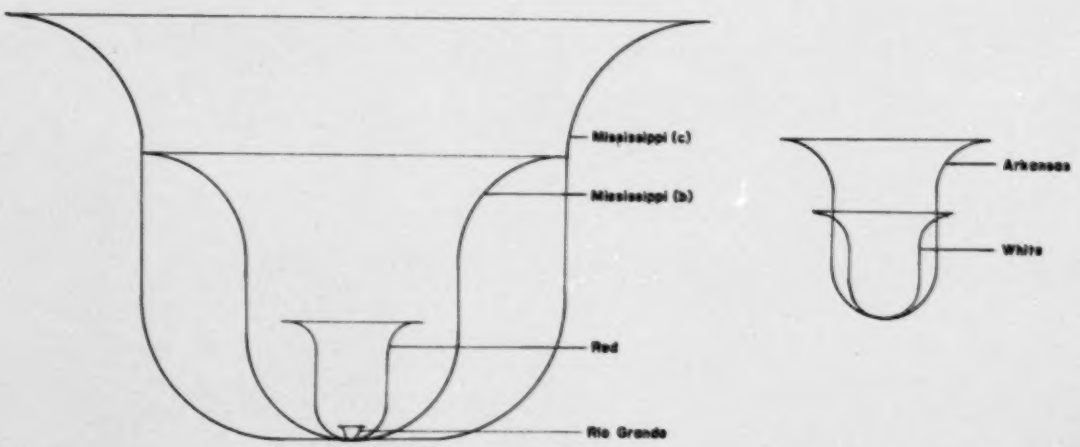


Figure 16. A comparison of mean flows of selected streams in the Lower Mississippi and Western Gulf Basins.

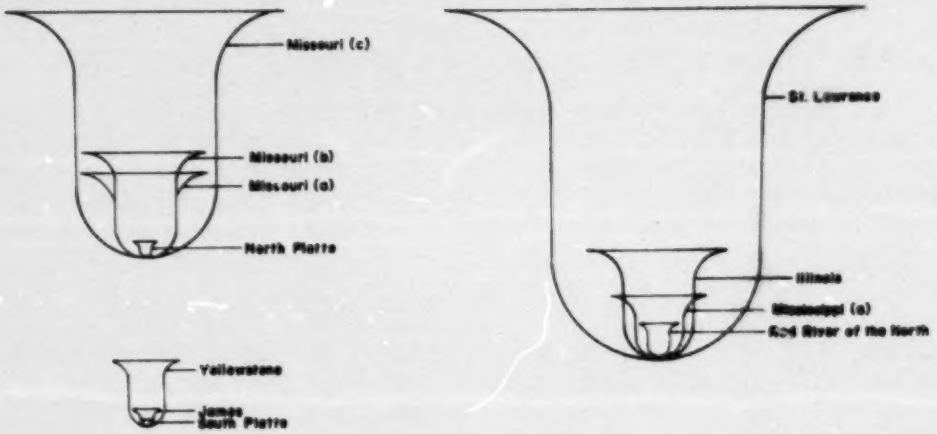


Figure 17. A comparison of mean flows of selected streams in the Missouri, Upper Mississippi and Great Lakes Basin.

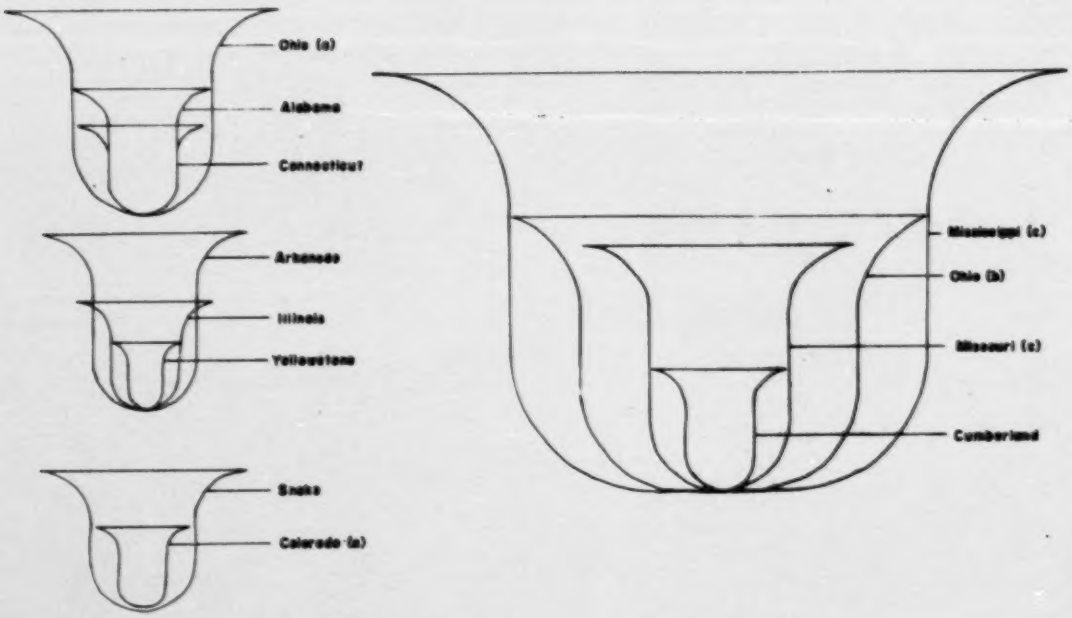


Figure 18. A comparison of mean flows of selected streams from each drainage basin.

Table 1. Alphabetical listing of selected streams and their maximum, minimum and mean flows in cubic feet per second (cfs), at particular U.S.G.S. Gauging Stations, for the year 1960.

| River | Location of Gauging Station | Momentary Maximum (cfs) | Minimum Day Flow (cfs) | Mean (cfs) | Remarks |
|---|---|---|---|---|---|
| Alabama | Claiborne, Ala. | 112,000 | 7,860 | 28,440 | Regulated Flow |
| Allegheny | Natrona, Pa. | 157,000 | 1,800 | 21,210 | " " |
| Apalachicola | Chattahoochee, Fla. | 157,000 | 8,110 | 25,070 | " " |
| Arkansas | Little Rock, Ark. | 350,000 | 8,060 | 62,390 | " " |
| Bear | Near Collinston, Calif. | 3,780 | 16 | 730 | " " |
| Clinch | Scarboro, Tenn. | 14,000 | 240 | 4,779 | " " |
| Colorado (a) | Near Grand Canyon, Arizona | 46,300 | 2,720 | 13,200 | " " |
| (b) | Near San Luis, Arizona | 10,120 | 8 | 1,099 | " " |
| Columbia (a) | Bridgeport, Washington | 288,300 | 50,100 | 121,900 | " " |
| (b) | Dalles, Oregon | 470,000 | 85,600 | 195,300 | " " |
| Connecticut | Thompsonville, Conn. | 156,000 | 1,180 | 22,490 | " " |
| Cumberland | Smithland, Ky. | 77,900 | 5,480 | 28,480 | " " |
| Delaware | Trenton, N. J. | 124,000 | 3,380 | 14,230 | " " |
| Hudson | Green Island, N. Y. | 134,900 | 1,570 | 17,190 | " " |
| Illinois | Meredosia, Ill. | 73,000 | 5,800 | 25,320 | " " |
| James | Near Scotland, S. D. | 13,900 | 1.5 | 795 | Not Regulated |
| Kanawha | Charleston, W. Va. | 141,000 | None Recorded | 16,170 | Regulated Flow |
| Mahoning | Lowellville, Ohio | 11,600 | 335 | 1,255 | " " |

Table 1. (Continued)

| River | Location of Gauging Station | Momentary Maximum (cfs) | Minimum Day Flow (cfs) | Mean (cfs) | Remarks |
|---|---|---|---|---|---|
| Merrimack | Below Concord River at Lowell, Mass. | 79,000 | 859 | 10,230 | Regulated Flow |
| Miami | Hamilton, Ohio | 18,500 | 292 | 1,842 | " " |
| Mississippi (a) | St. Paul, Minnesota | 43,300 | 1,950 | 9,871 | " " |
| (b) | St. Louis, Mo. | 670,000 | 80,500 | 208,400 | " " |
| (c) | Vicksburg, Miss. | 1,100,000 | 175,000 | 577,700 | " " |
| Missouri (a) | Near Williston, N. D. | 120,000 (Approx.) | 8,000 | 17,130 | " " |
| (b) | Sioux City, Iowa | 101,000 | 6,800 | 21,390 | " " |
| (c) | Hermann, Mo. | 330,000 | 21,400 | 79,170 | " " |
| Monongahela | Braddock, Pennsylvania | 108,000 | 1,660 | 11,620 | " " |
| Neuse | Kinston, N. C. | 14,100 | 730 | 4,996 | Not Regulated |
| Ohio (a) | Cincinnati, Ohio | 370,000 | 7,010 | 92,490 | Regulated Flow |
| (b) | Metropolis, Ill. | 588,000 | 79,800 | 247,100 | " " |
| Pearl | Bogalusa, Louisiana | 34,000 | 1,580 | 8,450 | Not Regulated |
| Pend Oreille | Below Z Canyon near Metaline Falls, Washington | 72,000 | 5,900 | 32,600 | Regulated Flow |
| Penobscot | West Enfield, Maine | 62,000 | 3,400 | 14,980 | " " |
| Pigeon | Newport, Tennessee | 7,820 | 92 | 1,442 | " " |
| Platte (North) | N. Platte, Nebraska | 2,080 | 150 | 559 | " " |
| Platte (South) | " " | 1,380 | 87 | 162 | " " |

Table 1. (Continued)

| River | Location of Gauging Station | Momentary Maximum (cfs) | Minimum Day Flow (cfs) | Mean (cfs) | Remarks |
|---|---|---|---|---|---|
| Potomac | Near Washington, D. C. | 124,000 | 1,140 | 11,890 | Regulated Flow |
| Red | Alexandria, Louisiana | 87,400 | 2,980 | 26,810 | " " |
| Red River of the North | Emerson, Manitoba | 30,500 | 349 | 2,630 | Not Regulated |
| Rio Grande | Lower Brownsville, Texas | 2,870 | 11.0 | 503 | Regulated Flow |
| Roanoke | Roanoke Rapids, N. C. | 32,400 | 1,500 | 10,800 | " " |
| Sacramento | Sacramento, California | 69,600 | 6,260 | 14,820 | " " |
| Savannah | Clyo, Georgia | 40,900 | 6,810 | 16,540 | " " |
| Saint Lawrence | Ogdensburg, New York | 307,000 | 195,000 | 239,000 | " " |
| Schuylkill | Philadelphia, Pa. | 51,200 | 274 | 2,950 | " " |
| Shenandoah | Millville, W. Va. | 37,900 | 664 | 3,029 | " " |
| Snake | Near Clarkston, Washington | 163,500 | 15,900 | 48,460 | " " |
| Susquehanna (a) | Wilkes-Barre, Pennsylvania | 201,000 | 982 | 19,880 | Not Regulated |
| (b) | Marietta, Pennsylvania | 370,000 | 3,410 | 46,830 | Regulated Flow |
| Suwannee | Near Wilcox, Florida | 28,600 | 8,000 | 12,930 | Flow below 14,000 cfs affected by tide. |
| Tombigbee | Near Leroy, Alabama | 110,000 | 800 | 25,380 | Regulated Flow |
| Truckee | Reno, Nevada | 2,620 | 128 | 318 | " " |

Table 1. (Continued)

| River | Location of Gauging Station | Momentary Maximum (cfs) | Minimum Day Flow (cfs) | Mean (cfs) | Remarks |
|---|---|---|---|---|---|
| Wabash | Mount Carmel, Illinois | 107,000 | 4,160 | 23,890 | Not Regulated |
| White | DeValls Bluff, Arkansas | 62,000 | 7,070 | 24,180 | Regulated Flow |
| Willamette | Wilsonville, Oregon | 112,000 | 6,000 | 25,380 | " " |
| Yellowstone | Sidney, Montana | 58,000 | 1,500 | 7,591 | " " |

Table 2. Selected U. S. streams and their mean flows in cfs at particular U.S.G.S. gauging stations ranked according to flow.

| River | Location of Gauging Station | Mean Flow (cfs) |
|---|---|---|
| Mississippi | Vicksburg, Mississippi | 577,700 |
| Ohio | Metropolis, Illinois | 247,100 |
| St. Lawrence | Ogdensburg, New York | 239,000 |
| Mississippi | St. Louis, Missouri | 208,400 |
| Columbia | Dalles, Oregon | 195,300 |
| Columbia | Bridgeport, Washington | 121,900 |
| Ohio | Cincinnati, Ohio | 92,490 |
| Missouri | Herman, Missouri | 79,170 |
| Arkansas | Little Rock, Arkansas | 62,390 |
| Snake | Near Clarkston, Washington | 48,460 |
| Susquehanna | Marietta, Pennsylvania | 46,830 |
| Pend Oreille | Below Z Canyon Near Metaline Falls, Washington | 32,600 |
| Cumberland | Smithland, Kentucky | 28,480 |
| Alabama | Claiborne, Alabama | 28,440 |
| Red | Alexandria, Louisiana | 26,810 |
| Tombigbee | Near Leroy, Alabama | 25,380 |
| Willamette | Wilsonville, Oregon | 25,380 |
| Illinois | Meredosia, Illinois | 25,320 |
| Apalachicola | Chattahoochee, Florida | 25,070 |
| White | DeValls Bluff, Arkansas | 24,180 |
| Wabash | Mount Carmel, Illinois | 23,890 |
| Connecticut | Thompsonville, Connecticut | 22,490 |
| Missouri | Sioux City, Iowa | 21,390 |
| Allegheny | Natrona, Pennsylvania | 21,210 |
| Susquehanna | Wilkes-Barre, Pennsylvania | 19,880 |
| Hudson | Green Island, New York | 17,190 |
| Missouri | Near Williston, North Dakota | 17,130 |

Table 2. (Continued)

| River | Location of Gauging Station | Mean Flow (cfs) |
|---|---|---|
| Savannah | Clyo, Georgia | 16,540 |
| Kanawha | Charleston, West Virginia | 16,170 |
| Penobscot | West Enfield, Maine | 14,980 |
| Sacramento | Sacramento, California | 14,820 |
| Delaware | Trenton, New Jersey | 14,230 |
| Colorado | Near Grand Canyon, Arizona | 13,200 |
| Suwannee | Near Wilcox, Florida | 12,930 |
| Potomac | Near Washington, D. C. | 11,890 |
| Monongahela | Braddock, Pennsylvania | 11,620 |
| Roanoke | Roanoke Rapids, North Carolina | 10,800 |
| Merrimack | Below Concord River at Lowell, Massachusetts | 10,230 |
| Mississippi | St. Paul, Minnesota | 9,871 |
| Pearl | Bogalusa, Louisiana | 8,450 |
| Yellowstone | Near Sidney, Montana | 7,591 |
| Neuse | Kinston, North Carolina | 4,996 |
| Clinch | Scarboro, Tennessee | 4,779 |
| Shenandoah | Millville, West Virginia | 3,029 |
| Schuylkill | Philadelphia, Pennsylvania | 2,950 |
| Red River of the North | Emerson, Manitoba | 2,630 |
| Miami | Hamilton, Ohio | 1,842 |
| Pigeon | Newport, Tennessee | 1,442 |
| Mahoning | Lowellville, Ohio | 1,255 |
| Colorado | Near San Luis, Arizona | 1,099 |
| James | Near Scotland, South Dakota | 795 |
| Bear | Near Collinston, California | 730 |
| Platte (North) | North Platte, Nebraska | 559 |
| Rio Grande | Lower Brownsville, Texas | 503 |
| Truckee | Reno, Nevada | 318 |
| Platte (South) | North Platte, Nebraska | 162 |

Table 3. Alphabetical listing of selected streams and the reference information for each stream.

| River | GSWS Paper | Part | No. | Page | Section |
|---|---|---|---|---|---|
| Alabama | " | 2-B | 1724 | 345 | 4295 |
| Allegheny | " | 3-A | 1725 | 57 | 495 |
| Apalachicola | " | 2-B | 1724 | 241 | 3580 |
| Arkansas | " | 7 | 1731 | 345 | 2635 |
| Bear | " | 10 | 1734 | 60 | 1180 |
| Clinch | " | 3-B | 1726 | 178 | 5355 |
| Colorado (a) | " | 9 | 1733 | 445 | 4025 |
| (b) | " | 9 | 1733 | 563 | 5222 |
| Columbia (a) | " | 12 | 1736 | 333 | 4380 |
| (b) | " | 14 | 1738 | 85 | 1057 |
| Connecticut | " | 1-A | 1721 | 250 | 1840 |
| Cumberland | " | 3-B | 1726 | 63 | 4385 |
| Delaware | " | 1-B | 1722 | 237 | 4635 |
| Hudson | " | 1-B | 1722 | 63 | 3580 |
| Illinois | " | 5 | 1728 | 541 | 5855 |
| James | " | 6-A | 1729 | 477 | 4785 |
| Kanawha | " | 3-A | 1725 | 248 | 1980 |
| Mahoning | " | 3-A | 1725 | 125 | 995 |
| Merrimack | " | 1-A | 1721 | 131 | 1000 |
| Miami | " | 3-A | 1725 | 351 | 2740 |
| Mississippi (a) | " | 5 | 1728 | 201 | 3310 |
| (b) | " | 7 | 1731 | 8 | 100 |
| (c) | " | 7 | 1731 | 365 | 2890 |
| Missouri (a) | " | 6-A | 1729 | 314 | 3300 |
| (b) | " | 6-A | 1729 | 488 | 4860 |
| (c) | " | 6-B | 1730 | 499 | 9345 |
| Monongahela | " | 3-A | 1725 | 108 | 850 |
| Neuse | " | 2-A | 1723 | 129 | 895 |
| Ohio (a) | " | 3-A | 1725 | 328 | 2550 |
| (b) | " | 3-A | 1725 | 548 | 6115 |

Table 3. (Continued)

| River | GSWS Paper | Part | No. | Page | Section |
|---|---|---|---|---|---|
| Pearl | " | 2-B | 1724 | 444 | 4895 |
| Pend Oreille | " | 12 | 1736 | 295 | 3985 |
| Penobscot | " | 1-A | 1721 | 37 | 345 |
| Pigeon | " | 3-B | 1726 | 94 | 4615 |
| Platte (North) | " | 6-B | 1730 | 127 | 6930 |
| Platte (South) | " | 6-B | 1730 | 211 | 7655 |
| Potomac | " | 1-B | 1722 | 522 | 6465 |
| Red | " | 7 | 1731 | 482 | 3555 |
| Red River of the North | " | 5 | 1728 | 107 | 1025 |
| Rio Grande | " | 8 | 1732 | 554 | 4750 |
| Roanoke | " | 2-A | 1723 | 109 | 805 |
| Sacramento | " | 11 | 1735 | 578 | 4475 |
| Savannah | " | 2-A | 1723 | 296 | 1985 |
| St. Lawrence | " | 4 | 1727 | 326 | 2640 |
| Schuylkill | " | 1-B | 1722 | 253 | 4745 |
| Shenandoah | " | 1-B | 1722 | 505 | 6365 |
| Snake | " | 13 | 1737 | 270 | 3435 |
| Susquehanna (a) | " | 1-B | 1722 | 351 | 5365 |
| (b) | " | 1-B | 1722 | 419 | 5760 |
| Suwannee | " | 2-B | 1724 | 187 | 3235 |
| Tombigbee | " | 2-B | 1724 | 412 | 4700 |
| Truckee | " | 10 | 1734 | 284 | 3480 |
| Wabash | " | 3-A | 1725 | 535 | 3775 |
| White | " | 7 | 1731 | 102 | 770 |
| Willamette | " | 14 | 1738 | 181 | 1980 |
| Yellowstone | " | 6-A | 1730 | 313 | 3295 |

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